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Editorial

Hydrological and Meteorological Extreme Events in Asia: Understanding, Modeling, Vulnerability, and Adaptation Measures

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Water-related extreme events have often occurred in recent decades over Asia due to climate change and rapid population growth, industrial development, and land use change. Their frequencies and intensities are reportedly intensified in the past and near future. Furthermore, the characteristics of these extreme events over Asia are quite different from the rest of the world due to their higher frequency and the lack of adequate data and infrastructure in the many developing countries which make it difficult to mitigate the risk of these extreme events. For example, in 2013, Typhoon Haiyan hit the Philippines with wind speeds over 315 km/h and resulted in more than a thousand casualties and losses of two billion US dollars. Therefore, understanding and modeling of such extreme events across Asia as well as their possible connection with climate change must be carefully investigated and reported so that their future effects can be appropriately predicted to mitigate their impacts on the society. In addition, innovative technologies and methodologies to forecast and analyze climate extremes in the Asian region are really helpful for water resources managers, decision- and policymakers, and civil and environmental engineers.

This special issue consists of seven research papers focusing on analyzing the hydrometeorological extreme events occurring in Asia and their future prediction employing the outputs of Global Climate Models (GCMs) as well as technological developments that are critical to the basins over Asia. Two papers discuss drought while two papers focus on flood and two papers deal with both flood and drought. Two drought papers employed the Standardized Precipitation Index (SPI) to summarize the current and future status of drought conditions. The two papers focusing on flood employ the Kalman filtering technology to assimilate rain-gauge observations and radar rainfall data for improving the forecasting accuracy. Wavelet analysis is also employed to define the evolution of the past, present, and future characteristics of hydrometeorological variables. One paper focused on the future climate projection of probable maximum precipitation (PMP) employing the future RCP scenarios of dew point temperature.

The editors consider that all the seven published papers are well established to present the extreme events of hydrometeorological variables over Asia and advanced technologies that are critical to analyze the variables. We hope that further updates on analyses of water-related extreme events and developments of technologies for predicting and analyzing those extremes must be continued for mitigating their impact and protecting our society in the condition that climate change intensifies the extremes.

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